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AUTHOR Gable, Robert A.; And Others
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ABSTRACT

The paper reports three investigations devoted to enhancing the language and/or motor-gestural repertoires of developmentally delayed and severely handicapped young children (n=8). Briefly discussed is research relating to each of the investigations, as well as methodological issues central to modifying social interaction. Noted among study findings are that intervention procedures composed of adult prompting and social reinforcement significantly increased the target behaviors of severely retarded multihandicapped Ss; that a training procedure based on an integration of developmental psycholinguistic, cognitive-semantic, and behavioral research was effective for teaching young developmentally delayed children a three element syntactical structure; and that the intervention procedure of increased social initiations by a peer confederate increased the positive social behavior of behaviorally disordered Ss. Following presentation of the studies, the authors touch on shortcomings of existing research and point out possible directions for future investigation. (SBH)

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# Assessment and Modification of Social Behavior of Children with Limited Behavior Repertoires[1]

Robert A. Gable
George Peabody College

Jo M. Hendrickson
George Peabody College

Phillip S. Strain
Middle Tennessee Mental Health Institute

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## Foreword

Recently there has been a tremendous surge of interest directed towards social skills development among children with limited behavior repertoires. The current movement toward placing exceptional children in "the least restrictive educational environment" has provided impetus for increased research focusing on the interrelated areas of language and social skills development.

The purpose of this presentation is to report three investigations devoted to enhancing the language and/or motor-gestural repertoires of developmentally delayed and severely handicapped young children. We shall discuss briefly research relating to each of our investigations, as well as methodological issues central to modifying social interaction. Following presentation of these studies we shall touch on shortcomings of existing research and point out possible directions for future investigation.

# Assessment and Modification of Social Behavior of Children with Limited Behavior Repertoires[1]

## Study 1

Research indicates that a variety of procedures are effective in producing positive social behaviors in moderate and severely retarded children. However, little evidence is available to suggest that the behaviors increased resulted in the development of reciprocal interaction beyond the training or experimental setting. One possible explanation for the lack of generalized behavior change is that the target responses employed have been selected and observed without reference to the function of these acts on the recipient's (peer's) behavior (Strain & Timm, 1974). In studies of normal (Charlesworth & Hartup, 1967; Greenwood, Walker, & Hops, 1977) and behaviorally disordered (Strain & Timm, 1974; Strain, Shores, & Kerr, 1976; Strain, Shores, & Timm, 1977) preschool children, investigators have found that particular motor-gestural and vocal-verbal social initiations are more likely to result in a positive peer response than other topographically similar behaviors.

The purposes of the first study we shall present were two-fold. Initially, the social behavior repertoire of severely retarded children was assessed by a continuous observational system that allowed an analysis of social behaviors in terms of initiator-responder units. By using such a system, it was possible to select target behaviors that have a high probability of being followed by positive peer

behavior in an interaction sequence. The second objective was to assess the effects of prompting and reinforcement tactics on the emission of selected responses on reciprocal interaction in training and generalization sessions.

## Method

### Subjects

The subjects, selected on the basis of classroom observation, were two multihandicapped children enrolled in a class for low functioning, nonacademic children. Preliminary observational data indicated that each subject seldom engaged in positive social interaction. The subjects, one male (Subject 1) and one female (Subject 2) were 11 and 10 years old, respectively. Subject 1 was nonverbal, possessed a limited repertoire of basic self-help skills, and according to school records was untestable. Subject 2 displayed minimal expressive language and physical aggression towards peers. Subject 2 scored 38 on the Stanford-Binet, Form L-M.

In addition to the target subjects, the peers who served in the study were four multihandicapped children from the same classroom. They ranged in age from 11 to 13 years of age. Records indicated three of the peers were untestable, while the fourth attained an IQ score (S-B) of 41. Two of the four peers were confined to wheelchairs and further restricted by braces. Three of the four peers exhibited extremely limited language facility--two had no expressive language repertoire and the third child had a vocabulary of approximately 10

words. The fourth peer spoke in sentences, but she seldom used her vocabulary in a socially appropriate manner.

## Setting

The study was conducted at a public special education school for multihandicapped children in Nashville, Tennessee. The training and generalization sessions of the study took place in a room immediately adjacent to two modular classrooms from which the children were chosen. This room was referred to as the "apartment," and contained furnishings typically found in a living room, i.e., a couch, two stuffed chairs, a desk and table, plus a small kitchen alcove.

## Materials

During training and generalization sessions throughout the study, the following play materials were available to the subjects and peers: a sponge ball, seven bean bags and a large plastic basket, a small airplane with wheels, and a set of large building blocks.

## Procedure

Data were collected in two daily periods: training and generalization. Each session lasted for a total of 12 minutes. Each subject was trained separately for six minutes. Generalization sessions immediately followed training sessions except for Generalization Training sessions. These sessions represented an attempt to control social interaction beyond the training environment after training was terminated.

Experimental Design

Two trainers, the two target subjects and the four peers, plus observers were present during training and generalization sessions. An equivalent time-samples design (Campbell & Stanley, 1963) in which target behaviors were trained sequentially was employed. The procedures in operation during each condition were:

Baseline period. No specific procedures were implemented by the trainers to increase any of the three target social behaviors. A trainer began each of the sessions by saying to the children:

> Everyone come here next to me. We will be doing things together each day at this time. Today you can play in any way you want. You can play with the toys. At times I will play with you and at times you'll be playing alone. The other people in the room are here to watch us and help me. Don't talk to them or try to play with them. O.K., you can start to play now.

Training period I. During this five-day condition, the trainers prompted and reinforced, on a continuous schedule, the subjects' Approach Gestures. No intervention was in effect to modify the subjects' level of Positive Physical Contact or Cooperative Play.

Training period II. During this six-day period, the trainers prompted and reinforced the subjects' Positive Physical Contact on a continuous schedule. No intervention was in effect at this time for either Approach Gestures or Cooperative Play emitted by the subjects.

Training period III. During this five-day period, the trainers prompted and reinforced cooperative play by the subjects on a continuous basis. No intervention was in effect, however, for Approach Gestures or Positive Physical Contact at this time.

Generalization training. During this phase, the training and generalization sessions previously described were terminated. For this five-day period, no specific directions or prompts were directed toward the subjects. Instead, the subjects and their peers were reinforced when they spontaneously exhibited any of the previously trained behaviors.

## Target Response Selection

A 10-day tally of all social behaviors emitted by the six children was obtained during a daily 20-minute free-play period. During this time, two trainers and two observers were present in addition to the children. Trainer-child interaction was limited to intermittent contacts. At two-minute intervals, a trainer (naive to the purposes of the study) was signalled to engage the children in some type of child-child interaction.

The observational methodology employed represents an elaboration of the procedures for response category selection outlined by Wahler (1967) and Strain and Cooke (1976). Continuous narrative records were made of the social behaviors of all children using such "action-object" phrases as, "Passes ball," "Takes toy," or "Hits me." These specific behaviors were also coded as to whether they occurred

(temporally) as initiated or responded events in an interaction sequence. Definitions of initiated and responded events were identical to those used by Strain, Shores, and Timm (1977). Initiated behaviors included all social responses emitted at least three seconds before or after another child's social response. Responded behaviors included all social responses emitted within three seconds of another child's social responses.

Data generated by this technique were collapsed subsequently into behavior categories according to Wahler's (1967) procedure for category identification of topographically similar behaviors. By identifying specific behaviors in terms of their distribution as initiated or responded events, it was possible to select behavior categories that were associated most often with reciprocal interaction. That is, categories of social behaviors were selected as target responses on the basis of their consistently setting the occasion for positive responding behaviors. The three target response categories emphasized and their operational definitions are presented below:

I. Approach Gestures: consisted of any deliberate behavior of the child which involved the hand(s), arm(s), or other body parts in a motion directed to another child, e.g., an inward circular hand and arm motion, repeated beinding and straightening of forefinger with arm extended towards a peer.

II. Positive Physical Contact: consisted of any deliberate behavior which brought the hand(s), arm(s), feet or other parts of the body into direct physical contact with another child in a positive manner, e.g., a soft touch, a pat, a hug, stroking or grasping--shaking hands, in a positive manner.

III. Cooperative Play: consisted of any discrete interactive pattern engaged in by two or more children, e.g., mutual playing and/or physically interacting with the same object or materials, or set of objects or materials with a common purpose.

Two categories of trainer behavior were recorded also:

I. Prompts: consisted of any partial or complete verbal direction and/or physical guidance of a child to emit a target response; and

II. Reinforcement: consisted of any positive verbal statement or physical contact, contingent upon a target child response.

Observational Procedures

Social behavior of each subject was recorded during both training and generalization sessions. Each subject was observed continuously for six minutes during training. During the 12-minute generalization session, each subject was observed for a total of six minutes. Here, the subjects' behavior was recorded continuously on alternating two-minute intervals. The order of observing was rotated daily. The observation protocol was divided into one-minute segments which were subdivided into six 10-second intervals. A tape recorder was used to identify the onset and conclusion of each 10-second interval. Each subject's behavior was coded in the interval in which the behavior began. Gestures were coded as G, Positive Physical Contact as I, and Cooperative Play as C. The observation protocol was designed to facilitate efficient recording of initiated and responded

behavior. This was accomplished by dividing each 10-second interval into three sections; the top section for teacher behavior, the middle section for subject behavior, and the bottom section for peer behavior. If, for example, a subject initiated a Cooperative Play behavior with a peer, C was placed in the subject section, or middle section of the interval. Also, an arrow was drawn from the C into the peer section or bottom section, to indicate that a peer had participated in the interaction.

The teacher behavior categories of prompts and reinforcements were recorded by placing P (prompts), and/or R (reinforcement) in the teacher section. An arrow was drawn from the teacher code to the subject's behavior code to indicate precisely which behavior was prompted and/or reinforced.

On each experimental day, one or two observers were seated in front of the kitchen alcove area. On days when reliability checks were taken, observers were stationed 1.5m apart and separated by a table. Prior to formal data collection, interobserver reliability was established at 85 per cent agreement across three 12-minute sessions. Interobserver reliability was calculated by dividing the number of intervals of agreement by the total number of agreement plus disagreement intervals, then multiplying by 100.

## Results

### Reliability

Ten reliability checks were made across all experimental conditions. Reliability ranged from 83 to 100 percent, with a mean of 90 per cent.

Trainers' Behavior

The frequency with which trainers prompts and reinforced target behaviors was tabulated for each subject across all experimental conditions. During Baseline, Subjects 1 and 2 received an average of .5 and 2.0 prompts per day respectively, and no reinforcement events. During the training periods, a mean of 8.5 and 9.4 prompts and 14.4 and 12.5 contingent praise statements were presented to Subjects 1 and 2, respectively. In generalization sessions, neither subject received any prompts or reinforcement. During Generalization Training, no prompts were delivered to either subject; however, an average of 15.8 and 12.4 reinforcers were presented to Subjects 1 and 2, respectively.

Subject 1

The Mann-Whitney U test (Siegel, 1956) was used for all comparisons of behavior change across conditions. The implementation of prompting and reinforcement procedures significantly increased Subject 1's level of Gestures ($U=5$, $p \leq .01$), Positive Physical Contact ($U=1$, $p \leq .001$), and Cooperative Play ($U=2$, $p$ .001) over the baseline level. Comparisons of behavior frequency across baseline generalization and treatment generalization sessions indicated a significant increase in Gestures ($U=14$, $p \leq .05$), Positive Physical Contact ($U=12$, $p \leq .02$), and Cooperative Play ($U=14$, $p \leq .05$) behavior during generalization periods following prompting and reinforcement. In a final comparison, behavior frequency was significantly higher in Generalization Training (reinforcement only condition) as opposed to generalization sessions

following Training (reinforcement only condition) as opposed to generalization sessions following Training (prompting and reinforcement) for Gestures ($U=2$, $p \leq .002$) and Cooperative Play ($U=6$, $p \leq .002$). No significant changes were observed on Positive Physical Contacts.

Subject 2

A similar pattern of behavior change was observed for this child. Again, the implementation of prompting and reinforcement procedures significantly increased Subject 2's level of Gestures ($U=1$, $p \leq .002$), Positive Physical Contact ($U=6$, $p \leq .01$), and Cooperative Play ($U=2$, $p \leq .002$) over baseline levels. Comparisons of behavior frequency across baseline generalization and treatment generalization sessions indicated a significant increase in Gestures ($U=4$, $p \leq .01$) and Cooperative Play ($U=7$, $p \leq .01$) during generalization periods following prompting and reinforcement, i.e., following training sessions. No significant changes were observed for Positive Physical Contact. Finally, behavior frequency was significantly higher in Generalization Training as opposed to generalization sessions following prompting and reinforcement for Cooperative Play only ($U=1$, $p \leq .008$).

## Discussion

The major results of this study were: (a) the intervention procedures composed of adult prompting and social reinforcement significantly increased the three target behaviors of two severely retarded, multihandicapped subjects over baseline levels; (b) this positive

behavior change exhibited during training sessions generalized significantly to free-play sessions when no prompting or reinforcement was provided (except for Subject 2's Positive Physical Contact); and (c) the Gesture and Cooperative Play behavior of Subject 1 and the Cooperative Play behavior of Subject 2 increased significantly over generalization sessions when reinforcement procedures (Generalization Training) were implemented for all target behaviors simultaneously.

Those results regarding the increase in positive social behavior subsequent to direct training replicate the treatment effects obtained by Stokes et al. (1974) and Whitman et al. (1970) using similar training tactics. However, the present study represents a significant expansion of these earlier efforts. First, the subjects and peers employed in this investigation represent a population with more limited behavioral repertoires than that employed in previous studies which have examined the development and generalization of social responses. Second, in the present study, target behaviors were selected on the basis of their consistently setting the occasion for a positive peer response. The efficacy of selecting target behaviors based on their function in the natural environment is clearly demonstrated by the observed generalized behavior change.

A number of factors acting singly or in combination may have contributed to the reduction in the level of target behaviors exhibited by the subjects during the generalization sessions that followed training. During training sessions, reinforcers were

dispensed on a continuous schedule. During the generalization sessions which followed training, however, no reinforcement was administered. Therefore, one might consider the generalization sessions to be comparable to an experimental extinction period. Implementation of an intermittent schedule of reinforcement during training sessions might well lead to an increased level of social responding during generalization. In addition to the effect that the schedule of reinforcement may have had on the level of response generalization, the characteristics of the population under investigation also may have contributed to the reduced level of social interaction during generalization. Children with extremely limited behavioral repertoires in fact present a two-fold response deficit: (a) those motor and verbal response topographies which would facilitate social interaction are not under appropriate environmental control, i.e., the social partner's behavior does not set the occasion for emitting social behavior nor for reinforcing the behavior once it has occurred. Given that children with severe retardation and multihandicaps have extremely limited behavior repertoires, social interaction training programs may require two different but interrelated objectives: (1) training should focus on the development of social responses which allow the subject to engage in interaction, and (2) training should focus on bringing these behaviors under the stimulus control of peers' behavior.

When continuous reinforcement was applied to all target behaviors as they occurred (Generalization Training), both subjects showed a

level of Cooperative Play significantly higher than that obtained during generalization sessions. The fact that Cooperative Play occurred more often than Gestures or Positive Physical Contact may suggest that for these subjects this response topography consistently functioned to set the occasion for prolonged social contact. Similarly, anecdotal reports by the observers indicated that Gestures and Positive Physical Contacts resulted in brief interaction episodes. For example, many Gestures functioned as social bids for subsequent Cooperative Play episodes and many positive Physical Contacts occurred within bouts of Cooperative play.

Other investigations (Strain, Shores, & Kerr, 1976; Strain, Shores, & Timm, 1977) have demonstrated a pattern of reciprocal response generalization similar to that documented in the present study. However, a number of important theoretical and applied issues related to social behavior training and generalization remain unanswered. First, it would seem advisable for future investigations to examine the acquisition and generalization of social responses where the schedule of reinforcement delivery is systematically manipulated. Second, it seems critical to more thoroughly address the issue of target response selection.

## Study II

Current literature on language learning is replete with recommendations for enhancing language development of handicapped children (Berry, 1976; Haring & Schiefelbusch, 1976; Lloyd, 1976; Schiefelbusch

& Lloyd, 1974). Procedures and recommendations for establishing speech and language in handicapped individuals have been predicated on: (a) learning theory principles (see Garcia & DeHaven, 1974; Harris, 1975; Sailor, Guess, & Baer, 1973), (b) developmental linguistic and psycholinguistic data (see Lee, 1974; Miller & Yoder, 1972; Ruder, 1972; Stremel, 1972), and (c) viewpoints recognizing the social communicative function of language (see Mahoney, 1975; Mahoney & Seely, in press; McLean & Snyder, 1977; Skinner, 1957). Until recently the goal of establishing initial speech has been a predominate concern (Garcia & DeHaven, 1974). With recognition of the importance of promoting child functioning in the natural environment, however, increased emphasis is currently being placed on developing language training programs to facilitate generalization of learned behaviors across time, settings, and people (Cooke, Cooke, & Apolloni, 1976; Harris, 1975).

Hester and Hendrickson (1977), Miller and Yoder (1972), and others have argued that operant theory has provided a functional analysis of the behavior and led to the development of effective training tactics--now referred to as applied behavior analysis (Baer, Wolf, & Risley, 1968), but that it cannot specify the sequence of grammatical structures to be programmed. A major limitation of behavioral investigations, as McLean and Snyder (1977) have noted, is that behavioral scientists have focused on training and generalization of language structure (e.g., inflectional endings and verb forms) to the exclusion of other relevant features of child language

(e.g., the function(s) of language during social interaction and the content or meaning of child utterances). Questions pertaining to (a) which grammatical structures to teach, (b) what lexicon to train, and (c) how to design training contexts that result in generalization of the trained behaviors have not been adequately addressed.

Developmental psycholinguistic and cognitive-semantic literature appear to provide an initial answer to some of these issues. Psycholinguistic literature (Brown, 1973) points out that children's language follows a general semantic-syntactic sequence. Bricker, Ruder, and Vincent (1976) noted that children talk about agent-action-object events they have witnessed in their environment and that these relationships are particularly critical to initial language development. In fact Bricker and Bricker (1974) have predicated their early language intervention program on this proposition.

The cognitive semanticists (Bloom, 1970, 1974; Bowerman, 1974; MacNamara, 1972; Schlesinger, 1974) have contended that the meaning that underlies child language may be equally or more important than the structure of the language emitted. By considering the meaning of child speech, that is, taking into account the environmental relations that children talk about, the probability of selecting lexicon that will be functional in the child's natural environment is increased. Cognitive semantic data lend strong support to the proposition that verbal language evolves from children's prior cognitive-perceptual experiences and environmental interactions. Therefore one might speculate that language programs which include names of persons,

objects and events known and relevant to the child would increase the probability that newly acquired language be maintained and used spontaneously.

Bruner (1974/1975; 1975) and Mahoney (1975) have emphasized the communicative nature of early language. Not only is language considered important to later social development but has critical interactive functions early in a child's development. These views support arguments for conducting language training in highly interactive social situations.

McLean and Snyder (1977) noted that the most promising approach to training generative, functional language may require an integration of perspectives on language learning. DeCecco (1967) and Staats (1974) have expressed similar viewpoints regarding empirical study of language. In a recent study on syntax acquisition and generalization Hester and Hendrickson (1977) employed a training strategy based on an integration of various perspectives. Their results documented the effectiveness of the training procedure to establish responses of the agent-action verb-object form. Hester and Hendrickson (1977) monitored child language in two untrained situations and found generative usage of the form in each setting. Their data lend empirical support to the view that language training programs predicated on an integration of perspectives may have promise for promoting generative language in developmentally delayed children.

The present study represents a replication and expansion of Hester and Hendrickson's (1977) investigation. A training strategy

combining developmental psycholinguistic, cognitive-semantic, and behavioral research was designed. This language training strategy included: (a) teaching children to describe salient agent-action-object relationships using conventional syntax, (b) using persons, objects, and actions familiar to the child, (c) creating a social-interactive language training context, and (d) the utilization of modeling and differential reinforcement procedures. The purpose of the present study was to investigate the effect of the language training procedure on the acquisition and generalization of a specific syntactical structure by three developmentally deficient young children. The children were trained to emit subject-action verb-object sentences to describe agent-action-object acted upon events demonstrated by their peers. Later, the children's behavior was monitored daily in the classroom in a nontraining context, i.e., free play, to assess spontaneous production of the following three dimensions of child language:

1. The syntactical structure--the subject-action verb-object form (directly trained), and

2. Action-labeling utterances--utterances which described ongoing actions or events (not directly trained) and

3. The use of oral language to mediate social interaction (not directly trained).

## Method

### Subjects

Three language delayed children enrolled in a community based, parent-implemented early intervention program (the Regional Intervention Program) were selected as target subjects. They ranged in age from 2 1/2 to 4 1/2 years old. Three peers of similar ages served as peer demonstrators during language training.

Initially, any child who was combining sounds into intelligible single word utterances and yet did not spontaneously display the grammatical form to be trained was considered a potential subject. Children considered potential subjects were observed during free play and their experiences with peers, actions and objects assessed in terms of content and frequency of behaviors. From these observations a pool of potential training items was constructed based on the materials and persons with whom the children interacted. Actions, objects and other children that consistently appeared to be "known" to the child were included. Finally, a five day prebaseline assessment on the children's expressive language was conducted using the pool of 45 potential training responses. Each child included in the present study performed with 0.0% correct on three-word syntactical subject-action verb-object form. Children who correctly combined agent-action, agent-object, or action-object were considered as candidates for training, although such responses were infrequent. All children imitated one word utterances on request.

Peers with high rates of positive social and verbal interactive behavior were selected as peer demonstrators. Only children with prior attendance records above 85% participated in the study.

## Setting

The investigation was conducted in the Language Classroom of the Regional Intervention Program (RIP). Parents served as trainers and primary data collectors.

Both language training and free play were conducted in the classroom. Language training sessions were conducted in a partially enclosed area (1 x 2.5 meters) separated from large group table work, and individual training activities. Materials used in training consisted of objects, toys and articles found in most preschools--pegs, balls, dolls, blocks, clothing, trucks, etc. Free play generalization was conducted in the free play area of the classroom. The free play area was approximately 12.25 square meters. It included a sandbox play area, a housekeeping area, a toy village area, a make-believe area, and a general play area.

## Materials

Response items from the total pool of 45 responses were grouped into three sets of various sizes depending on the subject (range 6-8 responses per set). Response sets I, II, and III were then trained during different intervention phases.

## Experimental Design

The experimental design of this study was a single subject, multiple baseline design (Baer, Wolf, & Risley, 1968). Within-subject replication was employed with three subjects to investigate the effects of the training tactic (Sidman, 1960).

## Data Collection

Data were collected on child behavior in two settings: (a) the language training area and (b) the free play area.

Training. Each day following training the subjects' verbal responses to training items were assessed on posttraining probes. During posttraining probe sessions three basic units of the child's verbal response were scored: (a) the subject, (b) the action verb, and (c) the direct object.

Free play. Each subject's oral language was recorded and coded along three dimensions during free play. The three dimensions were: (a) the syntactical form of the utterance, (b) whether the utterance was action labeling, and (c) whether the utterance occurred during a social interaction. First, two basic syntactical structures: (a) subject-action verb-object and (b) other subject-predicate responses were recorded. Second, child utterances were judged as describing: (a) action labeling events or (b) other relations. Third, child language was judged to occur: (a) during a social exchange or (b) during a noninteractive situation. Each word in an utterance had to be clearly understood to be recorded. A child's verbal behavior did not need to contain auxiliaries, inflectional endings, or articles to be recorded.

Operational definitions of the two syntactical forms were based on the definitions of Hester and Hendrickson (1977):

1. Subject-action verb-object utterances. Any utterance which contains an agent or subject of the sentence (a person or a thing), an action verb, and an object which is acted upon, or a combination of any two of the three units. For example, "man carrying eggs" represented a three unit subject-action verb object utterance, while "carry eggs" represented a two unit reduction of the subject-action verb-object utterance. Both were recorded as responses of the subject-action verb-object form.

2. Other subject-predicate utterances. Any response which included a subject and a verb, but did not fit the above definition (e.g., "want milk" and "me hungry).

Action labeling and other semantic relations were defined as follows:

1. Action labeling. Any utterance of two or more words made in reference to an action overlapping (to any degree) in time with the occurrence of the action event.

2. Other. Any other utterance.

Social interactive language behaviors were also monitored during free play. Social interactive verbal behavior included:

1. Initiated verbalization. All intelligible discrete verbal behavior emitted at least three seconds before or after another child's motor-gestural or verbal behavior.

2. Responded verbalization. All intelligible discrete verbal behavior emitted within three seconds of another child's motor-gestural or verbal behavior.

These definitions correspond to those introduced by Strain and Timm (1974).

Reliability checks conducted on child verbal behavior during training and free play. Each utterance was recorded verbatim and coded according to utilization of the subject-action verb-object form. During free play each utterance was judged as to whether or not it was an action labeling response. All child language was judged to be socially interactive or noninteractive. Interrater reliability was determined by dividing the total number of units of agreement by the total number of agreements plus disagreements x 100.

Procedure

Three specific procedures were employed in this study. One procedure was utilized to probe or test child performance on trained items, one to train the responses, and the third for free play. Each day between 10-11 a.m., the subjects were trained individually. A posttraining probe was conducted immediately after each subject's training session. Training and posttraining probes required approximately 15 minutes. Free play began shortly after 11 a.m. and included all the children in the classroom.

During training and probe sessions the subject and a peer were seated in small adjacent chairs. The trainer sat on the floor in

front of the children. Materials were kept in boxes next to the trainer. Teacher behavior during training was also recorded to insure the procedure was executed correctly.

Probe procedure. During the posttraining probe (test) sessions the peer demonstrated a designated action using a specified object. The trainer asked, "What's happening?" as the peer demonstrated the action. If the subject responded with any verbalization within five seconds, the trainer said, "OK" and continued to the next stimulus presentation. If the subject did not respond within five seconds, the trainer repeated the stimulus question. All verbalizations were acknowledged with an "OK" from the trainer. If the subject still did not verbalize, the trainer presented one word of the response to the child. The child was praised for "good talking" if he imitated the trainer. After two questions and a prompt on any given response item the next item was presented. Afterwards all children were thanked, praised and provided edibles.

Probe sessions lasted 3-5 minutes. All items in the response set being trained were probed (in random order) each day. Probe procedures were held constant across prebaseline, baseline and training conditions. In addition to probing all the items on the set being trained, items from set(s) not being trained were probed intermittently.

Training procedure. The training procedure was similar to the probe procedure. A peer performed a short demonstration of an action using a predetermined object. While the peer demonstrated the action,

the trainer asked, "What's happening?" If the subject responded correctly, i.e., all three units (two in the case of Subject 1) of the response were correct, the trainer praised the subject and provided edibles. If the subject responded incorrectly or gave no response within five seconds, the trainer turned her head away three seconds. The action was demonstrated again. The trainer repeated the question and immediately provided a model of the correct response for the child. This procedure was repeated no more than three consecutive times on any given response item.

Free play procedure. Daily observations were used to assess the occurrence of subject-action verb-object utterances, action labeling utterances, and social interactive behavior during free play. Each child was observed for a total of six minutes each day. Continuous data on one subject's behavior was collected for a given two-minute segment; next, two minutes was collected on the second subject, and so on. The order of observing the subjects was rotated on a daily basis.

Once during every two-minute observation a peer was asked to interact verbally with the subject being observed. An adult simply directed the peer to "go to _____ and ask him, 'What are you doing?'" or a similar question. A peer was prompted to interact three times during each free play period with each target subject. These prompted interactions continued across all intervention phases and provided a stable minimum number of opportunities for subjects to use expressive language in a social interactive context.

Experimental Conditions

The probe, language training, and free play procedures were the same for all subjects. Intervention conditions, however, varied slightly across subjects. Since conditions for the subjects differed slightly, each subject may be considered as a single experiment. Subject 1 and 2 were trained on Sets I and II. After completing training on Set II, Subject 1 moved out of Tennessee. Subject 2, however, was probed intermittently following training to determine if correct responding was maintained. Subject 3 learned most rapidly, and was able to be trained on Sets I, II, and III. In addition, Subject 3 participated in a fourth condition called the response rehearsal phase. During the response rehearsal phase three response items from each response set were randomly selected each day for (re)training.

Baseline. Baseline on child language during free play began prior to the onset of language training baseline. Response items from training Sets I, II, and III were probed during the baseline of training. Baseline probes were conducted each day during the same time.

Intervention Set I. Language training was conducted on Set I for subjects 1, 2, and 3. Each day posttraining probes followed the language training session; items from response sets not being trained were probed on an intermittent basis. Training continued on Set I until the subject attained three consecutive days with an average 90% correct on Set I daily posttraining probes. Free play continued with no modifications.

Intervention Set II. The procedures and criteria for training and probing Set II were identical with the procedures used during Set I. Free play monitoring continued.

Intervention Set III. The procedures for training and probing Set III were identical to the procedures used during Set I and Set II (only Subject 2 was trained on the third response set). There were no changes in the free play procedure.

Intervention Set I, II, and III. Daily retraining sessions were conducted on response items from each set. This phase was a response rehearsal phase. All procedures remained the same.

The procedures described above allowed: (a) assessment of the effect of training on three developmentally delayed children's elicited linguistic responses within a structured language session, and (b) assessment of the effect of training of the children's spontaneous subject-action verb-object utterances, use of action labeling and use of language during social interaction in a free play setting. More specifically, data were available on: (a) the success of subject-action verb-object training (expressed as percentage correct on daily posttraining probes), (b) the frequency of the linguistic structure (subject-action verb-object) during free play, (c) the frequency of action labeling during free play, and (d) the frequency of social interactive language during free play.

## Results

### Reliability

Interobserver agreement was calculated on posttraining probe data and free play generalization data. Interobserver reliability ranged between 81-100% across all phases of the study with 95.0% mean agreement.

### Daily Posttraining Probes

The percentage correct of subject-action verb-object (S-AV-O) responses (e.g., Janet push(ing) train) in each set across baseline and intervention phases was analyzed. The data showed that each child met criteria on the items only after training on the respective sets of responses.

Subject 1. Subject 1 reached criterion on Set II in fewer days than Set 1. Subject 1 required 23 days on Set 1 and 10 days on Set II. (Subject 1 was trained to emit two word action verb-object responses--versus the three word responses for Subject 2 and 3.)

Subject 2. Subject 2 did not reach criterion on Set 1 for 43 days. This may be partially due to the fact a different trainer began teaching Subject 2 on the 29th day of training (day number 51). Subject 2 reached criterion on Set II in 13 days, 30 days less than on Set I to reach criterion.

Subject 3. Subject 3 reached criterion on Set I after 26 days of training, Set II after 19 days, and Set III after just 6 days, decreases of 7 and 13 days from the preceding response sets.

Responses from all three sets maintained across time. That is, Subject 3 maintained 100.0% correct responding on probes subsequent to all training.

During the final phases of training all subjects' performance maintained at 100.0% accuracy.

Free Play

The frequency of subject-action verb-object (S-AV-O) utterances and action labeling (AL) utterances for Subjects 1, 2, and 3 during free play was also assessed. Subject-action verb-object utterances included any response which contained at least two components of the subject-action verb-object structure. All subjects exhibited a low frequency of S-AV-O sentences during baseline. At the onset of training no immediate increase in the frequency of either S-AV-O and AL utterances was evidenced. Rather, the frequency of S-AV-O and AL utterances increased gradually as training progressed across response sets. The frequency of S-AV-O and AL utterances during free play varied for individual subjects. Less than 1.0% of the lexicon of the total frequency of S-AV-O or AL utterances observed during free play had been directly trained.

Subject-action verb-object (S-AV-O) utterances. Subject 1's daily frequency of S-AV-O utterances during free play was substantially greater during intervention than during baseline. He emitted a daily average of .10 S-AV-O utterances throughout the baseline phase, 1.58 during Intervention Set I, and 3.31 during Set II.

For Subject 2, the daily frequency of S-AV-O utterances changed from an average baseline frequency of 1.47 to 1.92 to 5.4 to 3.0 utterances across Sets I, II, and III. However, it should be noted that Subject 2's baseline frequency of S-AV-O utterances was inflated as a result of atypical verbal behavior on day 21. On day 21 Subject 2's verbalizations during free play began subsequent to his imitating two specific verbal utterances. Later, Subject 2 continued to emit the same responses many times in rapid succession. When day 21 is not included in calculation of Subject 2's mean frequency of S-AV-O during baseline, the mean computes to .50. Mean frequencies of 1.92, 5.4, and 3.0 represent a relatively substantial change when compared with .50 as opposed to 1.47. Subject 2's average emission of S-AV-O utterances during response rehearsal (the last training phase) was variable but above the baseline rate.

During Intervention Set I and II Subject 3's mean frequency of S-AV-O utterances showed a marked increase in the free play setting. Subject 3 exhibited a daily baseline mean frequency of 1.55 (range= 0-6) which increased to 4.23 (range=0-25) during Set I. During Set II his mean frequency was 8.2 (range=3-16). His S-AV-O utterances remained at this level during the posttraining maintenance phase.

Action labeling (AL) utterances. Little change was evidenced in Subject 1's action labeling utterances during free play until the training of Set II (see Figure 5). Subject 1's mean frequency of

AL utterances during baseline was 0.0 responses, .21 during Set I training and 1.23 during Set II training. Subject 1's frequency of AL utterances increased steadily across training days on Set II.

Subject 2's AL utterances increased gradually after training began, but most dramatically during the response rehearsal phase. Subject 2's average AL utterance frequency during baseline was .33 (range=0-3). Subject 2 emitted a mean frequency of 1.00 (range= 0-20) AL utterances during intervention phases I-III and a mean frequency of 1.58 (range=0-3) during phase IV.

Subject 3's action labeling utterances increased from a mean frequency of .33 (range=0-3) during baseline to a mean frequency of 5.03 (range=0-13) across Sets I and II. His mean frequency of AL utterances was 2.8 (range=0-7) during posttraining.

To summarize, the baseline frequency of S-AV-O and AL utterances during free play was relatively low for all subjects during the initial days of training. Increases in the frequency of S-AV-O and AL utterances were observed concurrent with training on later sets.

Social interactive verbal behavior. The frequency of Subject 1, 2, and 3's social interactive verbal behavior was analyzed. Each subject's verbal language in social interactive situations increased subsequent to intervention. The verbal interactive behavior of the subjects increased at a gradual rate until it was substantially above baseline frequency. Subject 1's verbal interactive behavior increased during Intervention from a mean frequency of 1.53 (range=0-6) to 5.84 (range=0-20).

On the average Subject 2's verbal interactive behavior appears to have increased very slightly during Set I and was very erratic during later training. During the final two phases of training when Subject 2 emitted oral language, however, 90% of his utterances were during social interactive situations. Subject 1 also emitted 90% of his utterances during social interaction when Set II was being trained.

Subject 3's verbal interactive behavior gradually increased across training Set I and maintained at average levels slightly above baseline during Set II and the posttraining phase.

## Discussion

This experiment represents an expansion of research on training and generalization of communicative behavior and an example of an emergent line of research in applied behavior analysis--the investigation of the effect of training procedures on variables not directly manipulated (e.g., Cooke & Apolloni, 1976; Drabman & Lahey, 1974; Tracy, Briddel, & Wilson, 1974). The results of the study replicated the findings of Hester and Hendrickson (1977) with regard to the training of syntax and extended applied behavioral research on training and generative use of language forms (e.g., Clark & Sherman, 1975; Guess, Sailor, Rutherford, & Baer, 1968; Lutzker & Sherman, 1974; Martin, 1975). The results indicated that a training procedure based on an integration of developmental psycholinguistic (Brown, 1973), cognitive-

semantic (Bloom, 1973), and behavioral research (Harris, 1975) was effective for teaching young developmentally delayed children a three element syntactical structure. The study represents a significant expansion of language research with regard to both generalized and indirect effects of training procedures. The syntactical form training appeared to have generalized to the natural environment. In addition, collateral increases in variables (behaviors) not directly trained were noted. During free play each subject (a) emitted substantially more subject-action verb-object sentences, (b) increasingly used action labeling utterances, i.e., verbal language to describe action events, and (c) increasingly used oral language during social interactions.

## Implications

The current research has implications for both clinician and language researchers. First, the data showed that a language training strategy based on developmental psycholinguistic, cognitive-semantic, and behavioral approaches was effective in training a three element syntactical form (two elements for Subject 1) to three young developmentally delayed children. Second, the procedure appeared to promote generalization of the syntactical form and features of language not directly trained. These results lend support to the proposition that procedures based on an integration of current language perspectives may be particularly useful for language training with young language deficient children. Generalized covariation of language related behavior not directly trained appears to have been a positive by-product of the procedure used herein. This effect is particularly noteworthy. As concomitant generalized change in multiple dependent language variables becomes more predictable (based on empirical study), the ability of teachers to affect language learning should increase greatly.

The language training procedure used in this study is not recommended as the definitive procedure for training handicapped children, however it does illustrate how a program based on various theoretical positions might be designed. The data from this study lend credence to the general position that a comprehensive perspective on the language learning process can be translated into a practical language training program. Further, some aspects of the procedure may be particularly efficacious. For example, since peer participation is a central aspect of the tactic, training goals might be broadened to include objectives and procedures for changing peer behavior or integrating handicapped and nonhandicapped learners. This approach could increase teacher efficiency by expanding the 1:1 teaching ratio to 1:2 or 1:3.

The results of the present study also underscored the social interactive function of early language in developmentally delayed children. It was noted, for instance, that as oral language was used in the free play setting, it increasingly became a mechanism for social interactive behavior. The relationship between language learning and its social-communicative function is a much neglected area of educational programming and research. Research directed at the investigation of early and delayed language and the social interactive function(s) of language would enhance programs aimed at social skill and language development. It would seem advisable, for example, that clinicians and teachers conduct language training in social interactive contexts, contexts that may naturally (and with relative ease) promote adaptive communicative behavior. This consideration would seem particularly critical with children whose language deficits are relatively severe.

The issues discussed here are not new. Many commentators (Harris, 1975; McLean, 1977) have proposed that language research be aimed at systematically investigating the training and generalization of the multiple dependent and independent variables of language. The present study represents an attempt to initiate concurrent investigation of the syntax, semantic content and social-interactive functions of child language. Clearly, research is needed to identify variables in the environment which best promot acquisition and maintenance of early language. For the most part, the effect of numerous language training procedures on child use of various language behaviors and the functions of these behaviors in the natural environment remains to be assessed. As Martin (1975) and Garcia and DeHaven (1974) have noted, the goal of language research (and clinical practice) should now concentrate heavily on generalization and programming for the transfer of learning. Specific procedures which reliably result in generalized usage must be delineated. Only with such procedures can teachers and parents hope to alter the functional language repertoire of exceptional children. In turn, once procedures are delineated for facilitating generalization, they should be evaluated in comparison to other tactics and the most efficacious identified.

It can be argued that both naturalistic and manipulative research are required to discover the environmental arrangements which will promote the development, maintenance and productive usage of the

critical dependent variables of language. Clearly, without comprehensive systematic research designed to investigate the multiplicity of factors related to language learning, identification of the most relevant aspects of child language and the development of the most effective procedures for teaching language delayed children will not be forthcoming.

## Study III

Most children develop appropriate social behaviors that are judged to be competent and adaptive by social agents. An extensive body of research supports the fact that normal children, from birth onward, differentially attach pleasant or unpleasant connotations to various social stimuli in their environment, and consistently demonstrate positive social behavior in the presence of particular stimuli (Hunt, 1961; Piaget, 1954; Stechler & Carpenter, 1967). Some children, however, do not respond to social stimuli in this expected fashion. Instead, these children demonstrate social behavior patterns that are either nonresponsive or excessively responsive under normal conditions (Haring & Phillips, 1962; Rimland, 1963). For many behaviorally disordered children, social withdrawal is often the initial behavior pattern identified as being deviant (Greenwood, Hops, & Walker, in press). As Morse (1971) has indicated, developing appropriate social behavior is one of the major problems confronting educators of behaviorally disordered children.

Recent research on ameliorating social withdrawal among behaviorally disordered preschool children suggests that: (a) teacher prompts and social reinforcement functions to increase positive social behaviors (Buell, Stoddard, Harris, & Baer, 1968; Strain & Wiegerink, 1975); (b) teacher prompts and social reinforcement directed to one child is associated with collateral increases in positive social behavior by nontarget children (Strain & Timm, 1974; Strain, Shores, & Kerr, 1976); and (c) increased social initiations by age-peers serve to set the occasion for increased social responding by withdrawn children (Strain, Shores, & Timm, in press).

In the investigation by Strain et al. (in press), age-peers were trained to deliver social initiations to behaviorally disordered preschool youngsters. The results indicated that during periods of increased social initiations, the target children's emission of positive social behaviors increased dramatically over baseline conditions. Data collection was limited, however, to 20 minute training sessions in a restricted setting. A question of significant practical and theoretical importance is whether such an intervention results in behavior change that generalizes across time and settings. Thus, the purposes of the present study were to: (a) replicate the peer-mediated intervention and related behavior change; and (b) assess target subject behaviors in the training setting and during free-play periods following training.

## Method

### Subjects

The subjects were three behaviorally disordered preschool boys, ranging from 43 to 51 months-of-age. The children were enrolled in a private treatment center in suburban Washington, D.C. The selection of the subjects was based upon their excellent attendance record and teacher nomination that indicated that these boys were the most isolate youngsters in the class. Stanford-Binet (Form L-M) IQ scores on the subjects were as follows: Jim, 55; Tom, 47; and Rob, 50. All subjects displayed delayed language patterns and extreme opposition to adults' requests.

### Setting

The experimental sessions took place in a 7.5m X 12.0m playroom. This area contained gross- and fine-motor toys, dress-up clothes, and two kitchen areas complete with plastic fruits and vegetables, and small pots and pans. A one-way mirror and series of overhead microphones provided complete visual and auditory access to the children.

The generalization sessions took place in the subjects' classroom during free-play periods. The classroom, 10.5m X 14.0m, was equipped with play materials similar to those contained in the experimental setting. During free-play, all children in the class were involved in a variety of self-selected activities. The other members of the class were four boys and two girls, who displayed behavior patterns closely resembling those of the target subjects.

General Procedures

On each experimental day, the three boys were brought from their classroom to the experimental setting by an accompanying teacher who told the boys that this was a time to play together with friends. Experimental sessions continued for 15 minutes each day.

Free-play periods were begun each day by the teacher who instructed all class members that it was time to play together with freinds. Free-play sessions were also 15 minutes in length.

Behavioral Measures

An observational system employed by Strain et al. (1976) to assess dyadic interactions was used. The coding system included two general behavior classes, motor-gestural and vocal-verbal, along with their positive and negative topographic features. Specific operational definitions of positive and negative motor-gestural and vocal-verbal behaviors were also coded as to their temporal sequence of occurrence. Initiated behaviors included all general class responses that were emitted 3 sec before or after another child's motor-gestural or vocal-verbal behavior. Responded behaviors included all general class responses that occurred within 3 sec of another child's motor-gestural or vocal-verbal behavior.

Two categories of teacher behavior, prompting and social reinforcement, were also recorded. Operational definitions for these behaviors are contained in Strain et al. (1976).

## Observational Procedures

Training Sessions. Social behaviors of each subject and the peer confederate were recorded for five consecutive minutes (15 total minutes of observation). The order in which the subjects were observed was determined randomly each day. Recording began 1 min after the children entered the playroom. Entries of social behaviors were made by trained observers using coded symbols and a prepared record sheet. The behaviors were recorded in continuous fashion. Each social behavior was entered as having been emitted by either of the subjects ($S_1$, $S_2$, $S_3$) or the confederate (C); as belonging to one of the two behavior classes; as being either positive or negative in type; and as having been initiated or responded in nature. Teacher social reinforcement events were entered by placing the symbol (t) just above the social behavior immediately preceding delivery of the event. Teacher prompts were recorded in a like manner, using the symbol (P). On each experimental day, two observers were seated at a three-station observation desk, each station partioned from the other. All observations were made from a room immediately adjoining the playroom. Interrater reliability was calculated by dividing the total number of social behaviors and corresponding topographic descriptors recorded in agreement by that number plus those recorded in disagreement, then multiplying by 100. Agreement was reached only when both observers marked the same behaver ($S_1$, $S_2$, $S_3$, or C), the same topographic symbols (Positive, +; Negative, -), in the same

position (before or after behaver symbol), in the same general class, within the same 10-second interval block.

Generalization Sessions. Observation procedures identical to those described above were employed, with the following exception. The two observers were seated at an observation desk within the classroom. Interactions occurring in the classroom that did not involve one of the subjects were not recorded.

Intervention Procedures

A peer confederate, who emitted positive social behaviors toward the boys, was used to accelerate the subjects' frequency of emitting positive motor-gestural and vocal-verbal behaviors. The confederate, a 4 year-2 month old boy, was enrolled in the subjects' classroom as a "model" child. The child's Stanford-Binet (Form L-M) IQ score was 130.

Four 20-minute training sessions were conducted with the confederate prior to the beginning of the initial intervention period. During these sessions, the experimenter told the confederate that he was to try his best to get other children to play with him. The confederate also participated in role-playing situations with the experimenter. In these episodes, the experimenter assumed the behavior pattern typical of the subjects, and encouraged the confederate to initiate social play. Specifically, the confederate was given 10 opportunities in each of the four training sessions to initiate play with the experimenter by using a verbal signal such as

"Let's play blocks," or "Come play." On five of these occasions, the experimenter complied with the request. On the other five, the experimenter ignored the confederate for 10 seconds, then instructed the confederate that sometimes the children would not play with him, but that it was important for him to keep trying to initiate play. Additionally, the confederate was given 20 opportunities in each of the training sessions to initiate play by pairing the verbal signals with a motor response, such as handing the experimenter a toy truck or ball. On one-half of these occasions, the experimenter began to play. On the remainder, he ignored the confederate for 10 seconds and repeated his desire that the confederate continue to initiate play even though the children might ignore him. At the end of each experimental day, the experimenter verbally praised specific behaviors exhibited by the confederate.

Experimental Design

The study employed a withdrawal of treatment design (Baer, Wolf, & Risley, 1968). The procedures in operation during each condition are presented below.

Baseline 1.

The confederate was instructed not to initiate any social play with the subjects. However, no attempt was made to influence the behavior of the confederate regarding social initiations by the target children. The confederate was specifically told to, "Do as

you would usually do," when approached by target children. The accompanying teacher was instructed to remain as physically isolate as possible from the children, and not to prompt or reinforce any positive social behavior by any of the children. This desired teacher behavior did not represent a departure from the typical free-play environment provided in the children's classroom.

Intervention I. The confederate was instructed each day that he was to try his best to get the other children to play with him. The accompanying teacher was instructed again not to prompt or reinforce social behavior by any child.

Baseline II. This stage involved a return to conditions operating during Baseline 1, in which the confederate was instructed not to initiate social play with the subjects, but to respond as he usually would if approached by a subject.

Intervention II. This stage involved a reinstitution of intervention procedures in an effort to replicate the behavior change exhibited during the Intervention I stage.

During free-play generalization sessions, the confederate was not present.

## Results

### Reliability

Twenty reliability checks were conducted across all experimental conditions for treatment and generalization sessions. Cell by cell reliability on all behaviors reported ranged from 81-96 percent, with a mean of 86 percent.

Confederate's Behavior

Table 1 presents the range and mean number of social initiations by the confederate toward Jim, Tom, and Rob for each experimental condition. An examination of Table 1 suggests that the experimenter's instructions resulted in reliable alterations in the number of social initiations emitted by the confederate. Additionally, these data show that the number of social initiations directed toward each subject was quite similar.

(Insert Table 1 about here)

Table 2 presents the range and mean percent of social initiations by subjects that the confederate responded to across all experimental conditions. An examination of Table 2 shows that the confederate regularly attended to a high percentage of subject social initiations regardless of experimental condition.

(Insert Table 2 about here)

Teacher Behavior

No teacher prompts or reinforcements were observed throughout the study.

Subjects' Behavior

Training Data. The top portion of Figure 1 presents the frequency of positive motor-gestural and vocal-verbal behavior by Jim, Tom, and Rob across all experimental conditions. These data reveal that all subjects emitted few positive social behaviors

(Insert Figure 1 about here)

during the Baseline 1 condition. With increased social initiations by the confederate, the positive social behavior of all subjects increased dramatically during the Intervention I phase. Also, it is evident that the subjects were affected differentially by the intervention, with Jim and Rob responding most consistently to social initiations. This differential responding parallels the initial social responsiveness demonstrated by the subjects during Baseline I. During Baseline II, when the frequency of confederate initiations was reduced, the subjects' frequency of positive social behavior decreased abruptly. The differential increase in positive social responding exhibited during Intervention I was replicated during the Intervention II phase. A more fine-grain analysis of subjects' positive social behavior during intervention periods indicated that 20 percent of their increased responding was composed of initiated behaviors.

Generalization Data. The bottom portion of Figure 1 reveals that, within the classroom free-play period, all subjects emitted a stable, low frequency of positive social behavior across the Baseline I phase. When the confederate accelerated his rate of social initiations toward the subjects, positive social responding by Jim and Rob increased two-fold in the generalization setting. However, Tom's behavior was not affected. A subsequent decrease in the confederate's social initiations during Baseline II was accompanied by an abrupt deceleration in positive social responding by Jim and Rob. Once more, negligible effects were observed for Tom. For Jim and Rob, 50

percent of their increased social responding following intervention days was composed of initiated behaviors.

## Discussion

The major findings of the study were: (a) the intervention procedure consisting of increased social initiations by a peer confederate increased the positive social behavior of all subjects, and (b) for two of the three subjects (Jim and Rob), positive social responding in the treatment setting generalized to a free-play period that followed training session each day.

The data regarding subjects' responses to the confederate's initiations offer support for earlier observational studies that documented an occasion setting effect of social stimuli (Charlesworth & Martup, 1967; Kendon, 1967; Patterson & Reid, 1967). These results also replicate the treatment effects on withdrawn children's social behavior reported by Strain et al. (in press). One practical implication of the demonstrated setting effect of social stimuli is readily apparent. It would appear that grouping youngsters who display adequate social skills with isolate children could be employed to enhance the latter's social behavior development. It should be emphasized, however, that such heterogenous grouping in itself would not likely result in increased positive social behavior. Rather, careful instruction and programming of peers within an integrated setting seem to be required (Solomon & Wahler, 1973; Surratt, Ulrich, & Hawkins, 1969; Wahler, 1967).

The differential responsiveness of the subjects to the intervention indicates that the utilization of peer social initiations as a treatment

procedure is limited by the entry-level behavior of target children. Tom, for whom intervention was least effective, also displayed the fewest positive social behaviors during Baseline I. As Strain et al. (1976) have suggested isolate children with extremely limited repertoires may require direct shaping and differential reinforcement procedures to affect social behavior change. Now, more intensive observational research is required to develop a behavioral profile of withdrawn children who are likely to benefit most from various treatment procedures.

The assessment of subjects' social behavior in free-play periods suggests that increased social responding by Jim and Rob during intervention periods generalized to this nontreatment environment. Additionally, these subjects' generalization data reflect a maintenance of behavior change across a 23 hr time lapse between training and generalization sessions. The generalization data for Tom replicate the minimal treatment effects evidenced during training sessions. Although the generalization data for Jim and Rob represent an encouraging clinical finding, it is important to note that their frequency of positive social behavior during intervention phase generalization was approximately one-half that exhibited in training sessions. One variable that likely operated to depress the subjects' positive social behavior during generalization was the minimal social responsiveness of their nontrained peers. The data collection system employed here allowed an assessment of the percent of social initiations by target subjects that nontrained peers responded to

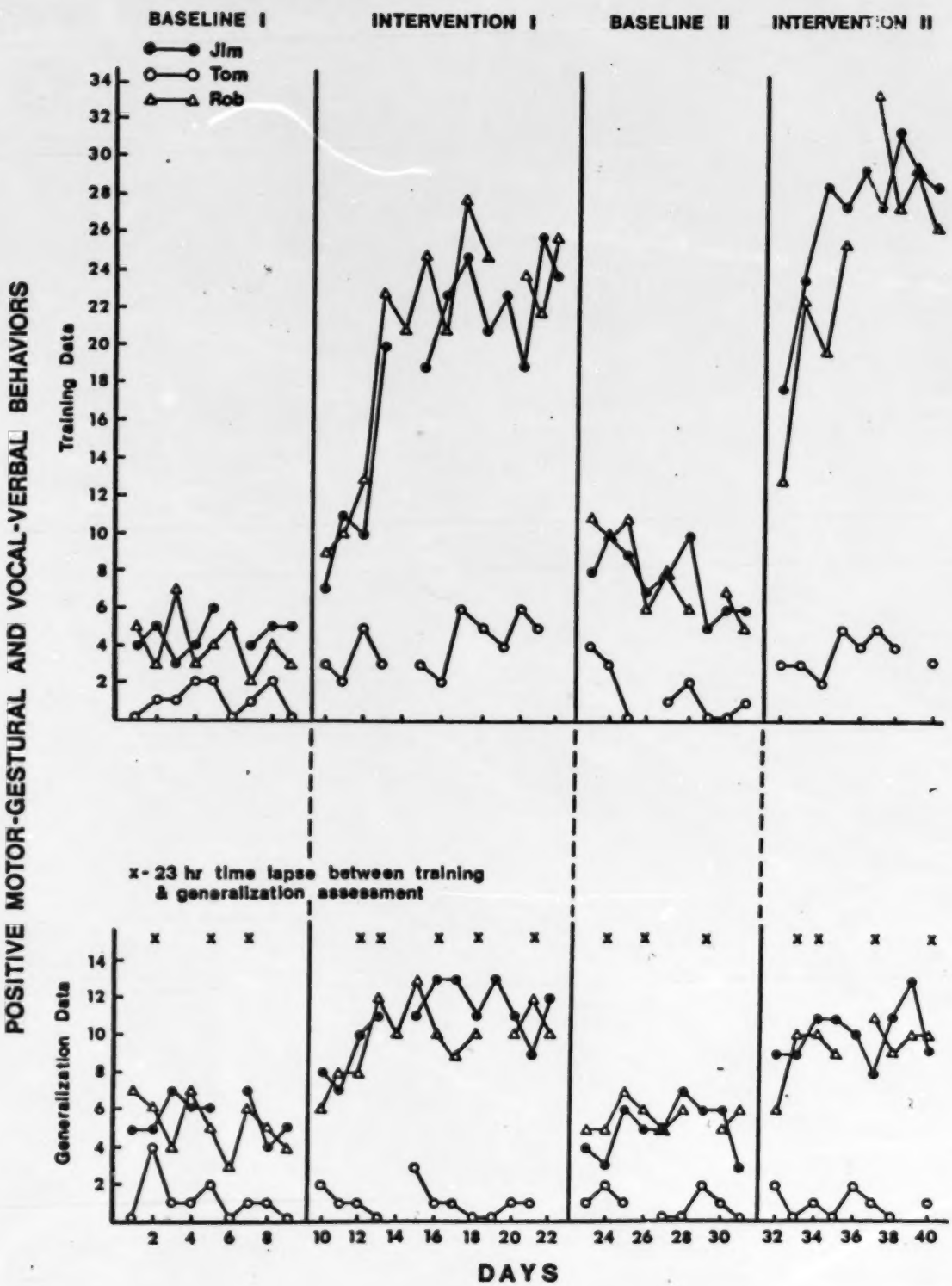
positively (see Table 2 for comparative data on confederate). Across all generalization sessions, the nontrained peers responded to an average of 10 percent of the subjects' social initiations in a positive manner. Thus, for the target subjects, the generalization sessions following intervention days may be conceptualized as extinction periods in which their positive social behavior towards peers was ignored consistently. Currently, research is being conducted in which the social responsiveness of nontrained peers is systematically controlled in order to clarify the behavioral parameters of social behavior generalization.

## General Discussion

In each of the aforegoing studies we discussed the development of motor-gestural and/or vocal-verbal behavior. In studies I and II discussion centered on teacher-oriented procedures; whereas, in the final investigation emphasis was placed on child-oriented training procedures.

In reconsidering the concept of mainstreaming we are aware that its success is dependent not only on temporal and instructional integration of handicapped children but their social integration as well. We recognize and are concerned that there exists a consistent lack of social acceptance of handicapped youngsters by their peers. Although much is as yet unknown regarding the most effective and efficient means for promoting social behavior we would hope that the information presented stimulates further inquiry and that we can continue to share our efforts with each other.

Figure 1


BASELINE I
INTERVENTION I
BASELINE II
INTERVENTION II
Jim
Tom
Rob
POSITIVE MOTOR-GESTURAL AND VOCAL-VERBAL BEHAVIORS
Training Data
Generalization Data
x - 23 hr time lapse between training & generalization assessment
DAYS

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